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AUTHOR Bichara, Kamal F.; Hazard, Francis E.
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ABSTRACT

An instrument for measuring student evaluation of teacher performance is described. The questionnaire, consisting of two parts of fourteen and seven questions, respectively, covers the following scales: analytic-synthetic approach, organization-clarity, instructor-group interaction, instructor-individual student interaction, dynamism-enthusiasm, mechanical details of the course, and overall effectiveness. Part I was intended for detailed feedback to the instructor, whereas Part II represents a summary of the major concerns in teaching evaluation as well as a detailed description of the important factors beyond the teacher's control which may have influenced the rating. Of a total sample of 1,911 students, 52 participated in this study. Two statistical computer programs were developed to analyze the data: one provided the basic statistics and the other performed a correlation analysis of variables. Conclusions suggest the importance of maintaining a distance between the faculty being evaluated and the students doing the evaluation, the assurance of students that completed evaluations will be inaccessible to the instructors until final grades are processed, and assurance of instructors that confidentiality of results is maintained. Other observations suggest that there may be an inverse relationship between positive student evaluation and the complexity of the class, and that a correlation may exist between the evaluation and the sex of both instructor and the student. A bibliography and the evaluation forms are appended. (MB)

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COMPUTERIZED STATISTICAL ANALYSIS OF STUDENT EVALUATION OF FACULTY

A Paper Presented at
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Special Interest Group for Community-Junior College Research

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by

Dr. Kamal F. Bichara, Engineering Technology
Dr. Francis E. Hazard, Dean
Kent State University
Tuscarawas Campus
New Philadelphia, Ohio

JC 790 026

Computerized Statistical Analysis of Student Evaluation of Faculty

KAMAL F. BICHARA, FRANCIS E. HAZARD

Kent State University

Abstract - This study describes an instrument that was developed and used to get student's input in the evaluation of the faculty. The instrument consists of two parts with a total of twenty-one questions. The system was used for a period of one year in classes of different disciplines. A statistical computer program was developed using FORTRAN IV to analyze the data. A detailed analysis of variables is provided on each variable. This includes the measure of skewness, kurtosis, the gaussian limits of the distribution using both (N) and (N-1), the standard error of the mean and standard deviation, and the critical limits of the mean at the 0.1, 1.0, and 5.0 percent significance level. Correlation analysis and instrument reliability in the determination of strength and weakness in faculty teaching are discussed.

I. INTRODUCTION

In an era of declining enrollment, it becomes imperative for educators to listen to student complaints in order to determine the sources of their frustrations and dissatisfaction.

Students object to curriculum; they demand assurance of relevance and are often in the best position to judge some of the criteria that relates to teaching effectiveness. As Van Waes (1968) noted, if students can criticize and actually share in the governance of their colleges, there will be an opportunity to confront institutional problems in a context that is both less dramatic and less explosive and probably more fruitful. Miller(1975) states that if one is forced to choose the most significant component of evaluating classroom teaching, it would be student evaluation. The evidence clearly indicates that students can evaluate teaching fairly and perceptively. The American Academy of Arts and Sciences (1971) noted that "student opinion... is crucial" in identifying and rewarding successful teachers.

Little is known about the scientific basis for the educational practice of evaluations. Since knowledge acquisition is done through the teaching process with the learning being the end product, the need for utilization of student opinion in the evaluation process is essential. It should be noted however that evaluation does not necessarily eliminate the need for

value judgement. Although some researchers caution about the use of student input in the evaluation of teaching (Rovin, 1967), several feel that the students are the ultimate consumers of the teacher's efforts, and they know best whether he has been effective or not (Renner, 1967).

The literature shows increasing use of teaching effectiveness as a criteria for promotion and tenure. Birnbaum (1966) reports that in twenty-seven of the thirty-four public, two-year colleges in New York State that were surveyed on twelve factors for promotion and tenure, the top-ranked factor was teaching performance and effectiveness.

This study is intended to develop and evaluate a reliable instrument to measure the strengths as well as the weaknesses of faculty teaching from the students point of view and to utilize the feedback generated toward better and more effective teaching.

II. EVALUATION INSTRUMENT

The student's evaluation of teacher questionaire was developed primarily on the basis of other successful questionaires previously used on this campus and elsewhere. The evaluation questionaire consists of two parts. The first part (Part I) consists of fourteen questions and the second part (Part II) of seven questions. Both parts are designed to cover the following scales: analytic-synthetic approach; organization-clarity; instructor-group interaction; instructor-individual student interaction; dynamism-enthusiasm as described by Hildebrand (1973); mechanical details of the course; and overall effectiveness.

Part I is intended for detailed feedback to the instructor whereas Part II represents a summary of the major concerns in teaching evaluation as well as a detailed description of the important factors beyond the instructor's control which may have influenced the rating.

Part II is primarily for administrative evaluation of the faculty and the course. It is felt that for appraisals to be fair; instructors should not be penalized for conditions over which they have little or no control, such as the level of the course objectives, the size of the class, inadequate laboratory facilities, class meeting time and improper course sequence or the student's personal problems. Gage (1961) reported on a research study conducted at the University of Illinois showing that: (1) teachers with a class load of thirty to thirty-nine students had lower ratings than did instructors with fewer students; (2) instructors and assistant professors received lower ratings than did associate professors and professors; (3) off-campus instructors received higher ratings than on-campus ones, and (4) teachers of elective courses had higher ratings than did instructors of required courses. On the back of the evaluating form there are three questions that are optional where the student has a chance to express in more detail the reason why he or she rated the instructor the way they did.

A copy of the complete instrument with the two parts and the questions is shown on Appendix A.

III. PROCEDURES FOR ADMINISTERING THE EVALUATION

The total sample size of the study is one thousand nine hundred and eleven (1911). A random sample of 52 students showed that 43 (83%) indicated that they would feel more free to express their opinions if the evaluation is done without the presence of the instructor. Fourty-six (88%) indicated that the evaluation should be administered by someone other than the instructor and that given an assurance that the instructor will not see the evaluation prior to submission of final grades would make them feel more at ease.

In this study, the evaluation was administered by someone other than the instructor whenever possible (74%) of the total evaluations and in all cases, student evaluations were directly submitted to the computer center and results were not returned until final grades were submitted.

Students completed the forms (Part I, II), answered the questions on the back (optional) and in all cases responses to the questionaire were transferred to the data cards by the students themselves or by the departmental secretary for maximum confidentiality. All forms and data cards were then turned in for processing.

IV. DATA AND RESULT ANALYSIS

Two statistical computer programs were developed to analyze the data. One provided the basic statistics and the other to perform a correlation analysis of variables. The programs are written in high level ANSI FORTRAN IV and are compiled using a TI 990/10 Texas Instruments mini-computer. The data cards were fed using an optical scanner.

Each class batch is processed and compiled separately followed by an overall processing for each instructor. Four categories are distinguished: Engineering Technology, Nursing, Business Technology and the remaining disciplines are grouped under other. Responses on all classes under each category are grouped and processed as one batch for each quarter and for all categories combined. At the end of one academic year the data for all categories combined are processed.

Each instructor receives the results for his or her classes and department as well as the overall Tuscarawas Campus results. Results are handled in complete confidentiality and copies are made available to administrators only upon instructor's consent or request.

The responses for Parts I and II are compiled separately in all cases as they utilize different scales. The examination of the instrument on Appendix A shows that in Part I a response of two represents a case of no opinion which is skipped in the analysis whereas in Part II the same response is significant as the scale is continuum.

The output of the analysis provides a summary table as shown on Tables 1 and 2 that gives a quick overview of population size, averages, standard deviation and range for each question as well as an overall average.

The examination of Table (1) shows that there is significant variation in the mean of the fourteen questions that ranges from 3.195 to 3.595. Table (2) shows that the range of the means of the seven questions is even wider, ranging from 3.006 to 3.570. Appendix B includes a detailed analysis of variance for the fourteen questions of Part (I). A close look at each variable statistics and the statistics of the means prove to be very helpful in interpreting the results of the evaluation of a particular instructor when compared to the campus or departmental norms. The Gaussian limits of the distribution show that with this sample size (1911), the distribution is rather selective and that at significance levels of 5, 1 and even 0.1 percent a reliable prediction of the expected mean can be obtained with a high degree of accuracy. The examination of the Kurtosis and Skewness of each variable is also given to sharply define the nature of the distribution.

Appendix C provides similar analysis to Appendix B for the seven variables of Part (II) of the instrument. It is interesting to note that due to the nature of the continuum scale of this part, there is a wider spread in the variable statistics.

A cross-correlation analysis of the fourteen variables of Part (I) is provided in Appendix D and is intended for the determination of the interdependence of each pair of variables. Conclusions of this analysis is given in Part V.

Table 1

TITLE: TUSCARAWAS CAMPUS OF KSU PART I

ANALYSIS OF STUDENT EVALUATION AT THE TUSCARAWAS CAMPUS OF KENT STATE UNIVERSITY FOR THE FALL OF 77, WINTER 78 AND SPRING 78.

THIS PART I INCLUDES THE FIRST 14 QUESTIONS OF THE EVALUATION FORM.

QUEST. NO.	OBS.	MEAN=	MINIM. VALUE	MAXIM. VALUE	STANDARD DEVIATION
1	1854	3.595	0.000	4.000	.6672
2	1753	3.234	0.000	4.000	.8941
3	1708	3.266	0.000	4.000	.8963
4	1780	3.248	0.000	4.000	.8280
5	1712	3.230	0.000	4.000	.9068
6	1683	3.195	0.000	4.000	.9389
7	1729	3.318	0.000	4.000	.8280
8	1795	3.562	0.000	4.000	.6661
9	1731	3.425	0.000	4.000	.7576
10	1670	3.226	0.000	4.000	.9397
11	1715	3.308	0.000	4.000	.8675
12	1627	3.333	0.000	4.000	.8377
13	1685	3.301	0.000	4.000	.9609
14	1744	3.367	0.000	4.000	.7991

THE OVERALL AVERAGE = 3.329

Table 2

TITLE: TUSCARAWAS CAMPUS OF KSU PART II

ANALYSIS OF STUDENT EVALUATION AT THE TUSCARAWAS CAMPUS OF KENT STATE UNIVERSITY FOR FALL 77, WINTER 78 AND SPRING 78.

THIS PART II INCLUDES THE SECOND 7 QUESTIONS OF THE EVALUATION FORM.

Quest. No.	Obs.	Mean=	Minim. Value	Maxim. Value	Standard Deviation
1	1911	3.570	0.000	4.000	.7338
2	1911	3.140	0.000	4.000	.9600
3	1910	3.077	0.000	4.000	.9824
4	1910	3.006	0.000	4.000	.9958
5	1910	3.163	0.000	4.000	.9462
6	1910	3.152	0.000	4.000	.9155
7	1910	3.234	0.000	4.000	.9281

The overall average = 3.192

V. CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

1 - Student evaluation should utilize an instrument that has been carefully designed and tested.

2 - Procedures followed for the distribution and collection of data should consider:
   A) The importance of maintaining a distance between the faculty being evaluated and the students doing the evaluating.
   B) Assurance of students that completed evaluations will be inaccessible to the instructors until final grades are processed.
   C) Assurance of instructors that total confidentiality of results is maintained.

3 - A major advantage of campus-wide evaluation involving various disciplines is to establish departmental norms that can be used in conjunction with promotion as opposed to a campus-wide norm which may be an inaccurate scale as was found in this study. An examination of Tables 3, 4 show that there exist a statistically significant variation in the overall average for both Parts I, II by quarter among various disciplines. Furthermore, this variation is consistent in all three quarters. The tables indicate that the overall averages are higher in Other categories than in Business than in Engineering than in Nursing. This observation suggests the following:
   A - There may be an inverse relationship between student evaluation and the complexity of the class as students may tend to give higher evaluation in easier disciplines.
   B - There may be a correlation between student evaluation and the sex of both instructor being evaluated and the student. This possibility warrants further study.

4 - Several researchers have raised the question of student's ability to evaluate instruction, to be objective, consistent and perceptive. The instrument used in this study was designed to address this question among others. Question eight (8) in Part I and question one (1) in Part II are in essence identical. Question six (6) in Part I and question two (2) in Part II are also similar. Finally question seven (7) of Part II and questions (1 through 6) should be highly correlated. A cross correlation of each pair of these variables mean for the entire population (1, 911 responses) is given in Table 5.

Table 3 - Quarterly Overall average by Department Part I

Department / Quarter Observed	Engineering Technology	Nursing	Business Technology	Other	Overall Tuscampus
Fall 77 (Average)	3.420	3.308	3.563	---	3.369
Observations	152	219	27	---	398
Winter 78 (Average)	3.333	3.310	3.436	3.45	3.374
Observations	115	237	155	198	705
Spring 78 (Average)	3.243	3.157	3.336	3.387	3.270
Observations	143	219	234	125	731

Table 4 - Quarterly Overall average by Department Part II

Department / Quarter Observed	Engineering Technology	Nursing	Business Technology	Other	Overall Tuscampus
Fall 77 (Average)	3.316	3.165	3.563	---	3.264
Observations	153	232	27	---	412
Winter 78 (Average)	3.137	3.128	3.308	3.389	3.243
Observations	120	243	157	211	731
Spring 78 (Average)	3.046	2.987	3.179	3.331	3.121
Observations	157	239	234	129	759

Table 5

Part	Variable	Part	Variable	Correlation Coefficient (r)
(I)	6	(II)	2	0.8789
(I)	8	(II)	1	0.7956
(II)	1 through 6	(II)	7	0.9466

The results of Table 5 showed that student's observations are consistent and results therefore could be reliable in the evaluation of classroom teaching.

5 - A crucial goal of this study along with developing a reliable instrument for teaching evaluation, is to determine as many factors as possible that are responsible for student's decision to continue enrolling in classes. Question thirteen (13) of Part I "I would take another course with this instructor" represents the most important question from that standpoint. Appendix D provides the cross-correlation results of all fourteen variables. The hypothesis in this case is that variables that show the highest correlation coefficient when correlated with variable (13) represent questions that are essential when problems of student retention are examined. While questions that are poorly correlated with question (13) may be insignificant for student retention, they should still be studied carefully as they may have impact on other aspects of effective teaching.

The correlation analysis of Appendix D relative to question 13 shows that the following questions are of significant importance (in descending order) relevant to the decision of whether or not to take another course with the instructor subject to the evaluation:

Question 6: The instructor handled his subject matter in a clear, organized fashion.
Question 14: I felt free to express myself when appropriate.
Question 5: The instructor used class time effectively.
Question 8: The instructor seems to know his subject matter well.
Question 10: The instructor commented adequately on papers and/or exams.
Question 9: The instructor is well prepared for individual classes.
Question 3: My interest in the subject matter has been stimulated by this course.
Question 4: There was essential agreement between the objectives of the course and what was actually covered.

These results should be considered carefully in instruction planning and administration as they may play an important role in attrition of students.

6 - Student evaluation of teachers can be very valuable to college administrators in evaluating a teacher's professional competence and effectiveness in any given course or speciality area. The results of the evaluation, when studied

carefully proved to be very valuable in deciding on teaching assignments of faculty to ensure the optimum utilization of faculty in classes where they can contribute the most to the institution and its growth.

A complete listing of the two source programs that were developed through this study written in Fortran IV ANSI could be obtained by writing to:

Kamal F. Bichara, Ph. D
Coordinator of Engineering Technology
Kent State University
Tuscarawas Campus
N. E. University Drive
New Philadelphia, Ohio 44663

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Appendix A

Appendix A

KENT STATE UNIVERSITY
Tuscarawas Campus

PART I

Evaluation Form

Instructor's Name _____ Course No. _____ Student's Major _____

Quarter Course Taken _____ Expected Grade_____ Student's College _____

DIRECTIONS: This survey gives you an opportunity to express yourself anonymously about this course and the way it has been taught. Your honest, objective evaluation is invited; to that end, your instructor will not see this until after the grades for this term have been submitted.

Items on this page should be completed by ~~r~~idding in one of the answers to the left of each question according to the following scale: 4 - strongly agree; 3 - agree; 2 - no opinion; 1 - disagree; 0 - strongly disagree.

Strongly Agree 4	Agree 3	No Opinion 2	Disagree 1	Strongly Disagree 0	
☐	☐	☐	☐	☐	1. My attendance in this course has been such that I am fully aware of what has occurred.
☐	☐	☐	☐	☐	2. I have worked to the best of my ability in this course.
☐	☐	☐	☐	☐	3. My interest in the subject matter has been stimulated by this course.
☐	☐	☐	☐	☐	4. There was essential agreement between the objectives of the course and what was actually covered.
☐	☐	☐	☐	☐	5. The instructor used class time effectively.
☐	☐	☐	☐	☐	6. The instructor handled his subject matter in a clear, organized fashion.
☐	☐	☐	☐	☐	7. Assignments (reading, writing, tests, other) were appropriately related to the substance of the course.
☐	☐	☐	☐	☐	8. The instructor seems to know his subject matter well.
☐	☐	☐	☐	☐	9. The instructor is well prepared for individual classes.
☐	☐	☐	☐	☐	10. The instructor commented adequately on papers and/or exams.
☐	☐	☐	☐	☐	11. The instructor returned tests or other written work within a reasonable time.
☐	☐	☐	☐	☐	12. The instructor was available for consultation.
☐	☐	☐	☐	☐	13. I would take another course with this instructor.
☐	☐	☐	☐	☐	14. I felt free to express myself when appropriate.

PART II

STUDENT INPUT INTO FACULTY EVALUATION

This is a concise evaluation form to provide student input into faculty evaluation. You are not required to sign your name. A summary of the results may be reviewed with the instructor after the course is completed.

Excellent	Good	Adequate	Fair	Poor	
4	3	2	1	0	
☐	☐	☐	☐	☐	Instructor's knowledge of subject.
☐	☐	☐	☐	☐	Ability to develop and communicate subject matter.
☐	☐	☐	☐	☐	Ability to encourage student participation and understand student viewpoints.
☐	☐	☐	☐	☐	Ability to promote the desire to learn.
☐	☐	☐	☐	☐	Ability to evaluate fairly.
☐	☐	☐	☐	☐	Fulfillment of course and class responsibilities including course organization.
☐	☐	☐	☐	☐	Over-all evaluation of instructor's performance.

Please circle any factors beyond the instructor's control which inhibited your learning:

Class size Class meeting time

Inadequate facilities Inadequate equipment Inadequate supplies

Improper course sequence Problems with prerequisites

My lack of interest in course or curriculum

My personal problems during the term

(over)

Appendix A

All students should answer the next three questions, which may well be the most important part of this evaluation.

Please comment on the instructor's general teaching performance in this course.

What advice would you give to the instructor for the next time he teaches the course.

Please comment on the value of this course to you.

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